

Data: NEW.STA 10v * 10c							
#	1 VAR1	2 VAR2	3 VAR3	4 VAR4	5 VAR5	6 VAR6	7 VAR7
1	0.000	2.500	3.000				
2	1.000	5.500	5.000				
3	2.000	7.000	7.000				
4	3.000	9.000	9.000				
5	4.000	12.000	11.000				
6	5.000	14.000	13.000				
7	6.000	12.000	15.000				
8							
9							
10							



STATISTICA: Nonlinear Estimation

File Edit View Analysis Graphs Options Macro Window Help

0. [Icons] Vars Cases [Icons]

Data: NEW.STA 10v \* 10c

#	1 VAR1	2 VAR2	3 VAR3	4 VAR4	5 VAR5	6 VAR6	7 VAR7
1	0.000	2.500	3.000				
2	1.000	5.500	5.000				
3	2.000	7.000	7.000				
4	3.000	9.000					
5	4.000	12.000					
6	5.000	14.000					
7	6.000	12.000					
8							
9							
10							

**Nonlinear Estimation**

- User-specified regression**
- Logistic regression
- Probit regression
- Exponential growth regression
- Piecwise linear regression

OK Cancel Open Data SELECT CASES \$ 10 W

Ready Output:OFF Sel:OFF Weight:OFF

STATISTICA: Nonlinear Estimation

File Edit View Analysis Graphs Options Macro Window Help

0. [Icons]

Data: NEW.STA 10v \* 10c

#	1 VAR1	2 VAR2	3 VAR3	4 VAR4	5 VAR5	6 VAR6	7 VAR7
1	0.000	2.500	3.000				
2	1.000	5.500	5.000				
3	2.000	7.000	7.000				
4	3.000						
5	4.000						
6	5.000						
7	6.000						
8							
9							
10							

**User-Specified Regression Function**

Function to be estimated & loss function

Function: none

Loss: none

Missing data: Casewise

OK Cancel

SELECT CASES

Define the function; For help, press F1

Output:OFF Sel:OFF Weight:OFF

#	1 VAR1	VAR2
1	0.000	2.000
2	1.000	5.000
3	2.000	2.000
4	3.000	1.000
5	4.000	1.000
6	5.000	1.000
7	6.000	1.000
8		
9		
10		

**Estimated function and loss function**

**Estimated function:**

v3=const1\*v1+const2

**Loss function:**

L = (OBS-PRED)\*\*2

OK  
Cancel  
Open  
Save As  
Variables

Estimated function: 'estimated var' = expression; e.g.: v2=constant+beta\*v3  
 Loss function: L = expression; e.g.: L=(obs-pred)\*\*2  
 Valid operators: + - \* \*\* / < > >= <= <> = ( )  
 Reference variables by number or name; e.g.: v3=b1\*v4 or COST=b1\*SIZE  
 All unrecognized names are parameters; e.g.: v3=const+beta\*v4  
 Use standard or scientific notation; e.g.: v3=b1\*v1/3e+2  
 Constants: Pi=3.14...; Euler=2.71...; e.g.: v3=b\*Euler\*v3  
 Functions: abs arcsin cos exp log log2 log10 sign sin sinh sqrt tan  
 Logical operations: true=1, false=0; e.g.: v2=b1\*v3\*(v1<0)+b2\*v3\*(v1>=0)  
 In loss function: PRED = predicted value, OBS = observed value  
 Default loss function is 'Least Squares,' that is: L=(OBS-PRED)\*\*2  
 Example 1: Failure=exp(b0+b1\*Strength) L=v5\*(OBS-PRED)\*\*2  
 Example 2: v4=exp(a+b1\*v4)/(1+exp(a+b1\*v4)) L=Weight\*abs(OBS-PRED)

STATISTICA: Nonlinear Estimation

File Edit View Analysis Graphs Options Macro Window Help

0. [Icons] Vars Cases [Icons]

Data: NEW.STA 10v \* 10c

#	1 VAR1	2 VAR2	3 VAR3	4 VAR4	5 VAR5	6 VAR6	7 VAR7
1	0.000	2.500	3.000				
2	1.000	5.500	5.000				
3	2.000	7.000	7.000				
4	3.000						
5	4.000						
6	5.000						
7	6.000						
8							
9							
10							

**User-Specified Regression Function**

Function to be estimated & loss function

Function:  $v3 = \text{const1} * v1 + \text{const2}$

Loss:  $(\text{OBS} - \text{PRED})^2$

Missing data: Casewise

OK Cancel

SELECT CASES [Icons]

OK to continue; For help, press F1    Output:OFF    Sel:OFF    Weight:OFF

STATISTICA: Nonlinear Estimation

File Edit View Analysis Graphs Options Macro Window Help

Model Estimation

Model is:  $v3 = \text{const1} * v1 + \text{const2}$

Number of parameters to be estimated: 2

Loss function:  $(\text{OBS} - \text{PRED})^{**2}$

Dependent variable: VAR3

Independent variables: VAR1

Missing data are casewise deleted

Number of valid cases: 7

Estimation method: Quasi-Newton

☐ Asymptotic standard errors
 ☐ Cja for finite diff. approx., 1.E-8

Maximum number of iterations: 50

Convergence criterion: .00010

Start values: .1 for all parameters

Initial step size: .50 for all parameters

Means & standard deviations

Matrix plot for all variables

Box & whisker plot for all vars.

OK

Cancel

For help, Press F1

Output:OFF

Sel:OFF

Weight:OFF

STATISTICA: Nonlinear Estimation

File

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Model Estimation

Model is:  $v3 = \text{const1} * v1 + \text{const2}$

Number of parameters to be estimated: 2

Loss function:  $(OBS - PRED) ** 2$

Parameter Estimation

Iteration	Loss	Parameters
* 5		
* 6		
* 7		
* 8		
* 9		
* 10		
* 11		
*		

STATISTICA

i

Predictors are probably very redundant; estimates suspect.

OK

Cancel

OK

Convergence criterion: .00010

Means & standard deviations

Start values: .1 for all parameters

Matrix plot for all variables

Initial step size: .50 for all parameters

Box & whisker plot for all vars.

Computing; please wait...

Output:OFF

Sel:OFF

Weight:OFF

STATISTICA: Nonlinear Estimation

File

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Model Estimation

Model is:  $v3 = \text{const1} * v1 + \text{const2}$

Number of parameters to be estimated: 2

Loss function:  $(\text{OBS} - \text{PRED}) ** 2$

Parameter Estimation

Iteration	Loss	Parameters
* 5	.000000	1.99994 3.00020
* 6	.000000	1.99994 3.00016
* 7	.000000	1.99994 3.00016
* 8	.000000	1.99997 3.00008
* 9	.000000	2.00000 3.00000
* 10	0.00000	2.00000 3.00000
* 11	0.00000	2.00000 3.00000
*		

STATISTICA

i

Predictors are probably very redundant; estimates suspect.

OK

Computing; please wait...

Output:OFF

Sel:OFF

Weight:OFF

STATISTICA: Nonlinear Estimation

File Edit View Analysis Graphs Options Macro Window Help

Model Estimation

Model is:  $v3 = \text{const1} * v1 + \text{const2}$

Number of parameters to be estimated: 2

Loss function:  $(\text{OBS} - \text{PRED}) ** 2$

Parameter Estimation

Iteration	Loss	Parameters
* 5	.000000	
* 6	.000000	
* 7	.000000	
* 8	.000000	
* 9	.000000	
* 10	0.00000	
* 11	0.00000	
*		

STATISTICA

View results anyway?

Yes

No

Cancel

OK

Convergence criterion: .00010

Means & standard deviations

Start values: .1 for all parameters

Matrix plot for all variables

Initial step size: .50 for all parameters

Box & whisker plot for all vars.

Computing; please wait...

Output:OFF

Sel:OFF

Weight:OFF

## Model Estimation

Model is:  $v3 = \text{const1} * v1 + \text{const2}$ 

Number of parameters to be estimated: 2

Loss function:  $(\text{OBS} - \text{PRED}) ** 2$ 

## Parameter Estimation

Iteration	Loss	Parameters
* 5	.000000	1.99994 3.00020
* 6	.000000	1.99994 3.00016
* 7	.000000	1.99994 3.00016
* 8	.000000	1.99997 3.00008
* 9	.000000	2.00000 3.00000
* 10	0.00000	2.00000 3.00000
* 11	0.00000	2.00000 3.00000
*		

Parameter estimation process converged

Cancel

OK

Convergence criterion: .00010

Means &amp; standard deviations

Start values: .1 for all parameters

Matrix plot for all variables

Initial step size: .50 for all parameters

Box &amp; whisker plot for all vars.

## Results

Model is:  $v3 = \text{const1} * v1 + \text{const2}$ 

Dependent variable: VAR3

Independent variables: 1

Loss function:  $(\text{OBS} - \text{PRED}) ** 2$ 

Final value: 0.000000000

Proportion of variance accounted for: 1.000000000 R = 1.000000000



Parameter estimates



Fitted 2D function &amp; observed vals



OK



Cov./corr. of parameters



Fitted 3D function &amp; observed vals

Cancel

☐ Scale MS-error to 1

Distribution of residuals



Residual values



Normal probability plot of residuals



Predicted values



Half-normal probability plot



Observed values



Predicted vs. observed values



Means &amp; standard deviations



Predicted vs. residual values



Difference (previous model)



Matrix plot for all variables



Save predicted and residual values



Box &amp; whisker plot for all vars.

STATISTICA: Nonlinear Estimation

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0.

Results

Model is:  $v3 = \text{const1} * v1 + \text{const2}$

Dependent variable: VAR3

Independent variables: 1

Loss function:  $(\text{OBS} - \text{PRED}) ** 2$

Final value: 0.000000000

Proportion of variance accounted for: 1.000000000 R = 1.000000000

Parameter estimates

Fitted 2D function & observed vals

OK

Cov./corr. of parameters

Fitted 3D function & observed vals

Cancel

☐ Scale MS-error to 1

Distribution of residuals

Residual values

Normal probability plot of residuals

Predicted values

Half-normal probability plot

Observed values

Predicted vs. observed values

Means & standard deviations

Predicted vs. residual values

Difference (previous model)

Matrix plot for all variables

Save predicted and residual values

Box & whisker plot for all vars.

For help, Press F1

Output:OFF

Sel:OFF

Weight:OFF

Data: NEW.STA 10v \* 10c

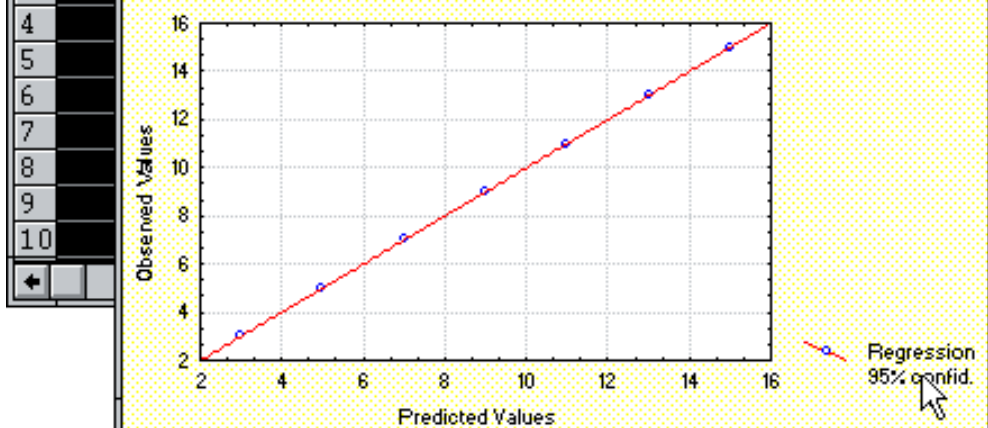
[illegible]

#	V	=	Observed versus Predicted Values	▼	▲
---	---	---	----------------------------------	---	---

1 **Continue...** Observed versus Predicted Values

2 Observed Values = 0.0000 + 1.0000 \* Predicted Values

3 Correlation:  $r = 1.0000$



A scatter plot showing the relationship between x and y. The x-axis ranges from 2 to 16, and the y-axis ranges from 2 to 16. There are three data points plotted at approximately (2.5, 3.5), (3.5, 4.5), and (4.5, 5.5). A red regression line is drawn through these points, and a blue shaded area represents the 95% confidence interval. The legend indicates 'Regression' (red line) and '95% confid.' (blue shaded area).

Cont  
➔

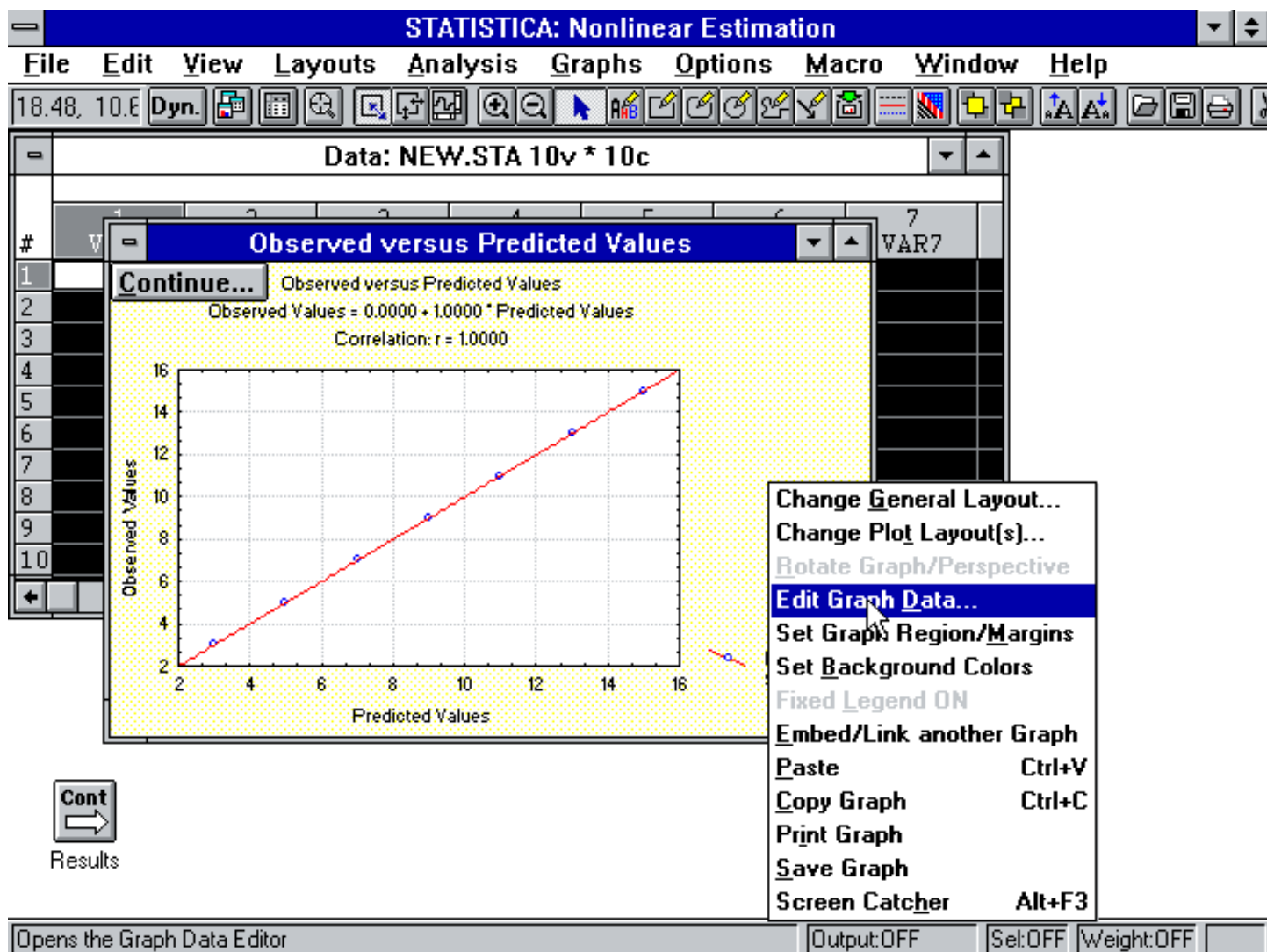
## Results

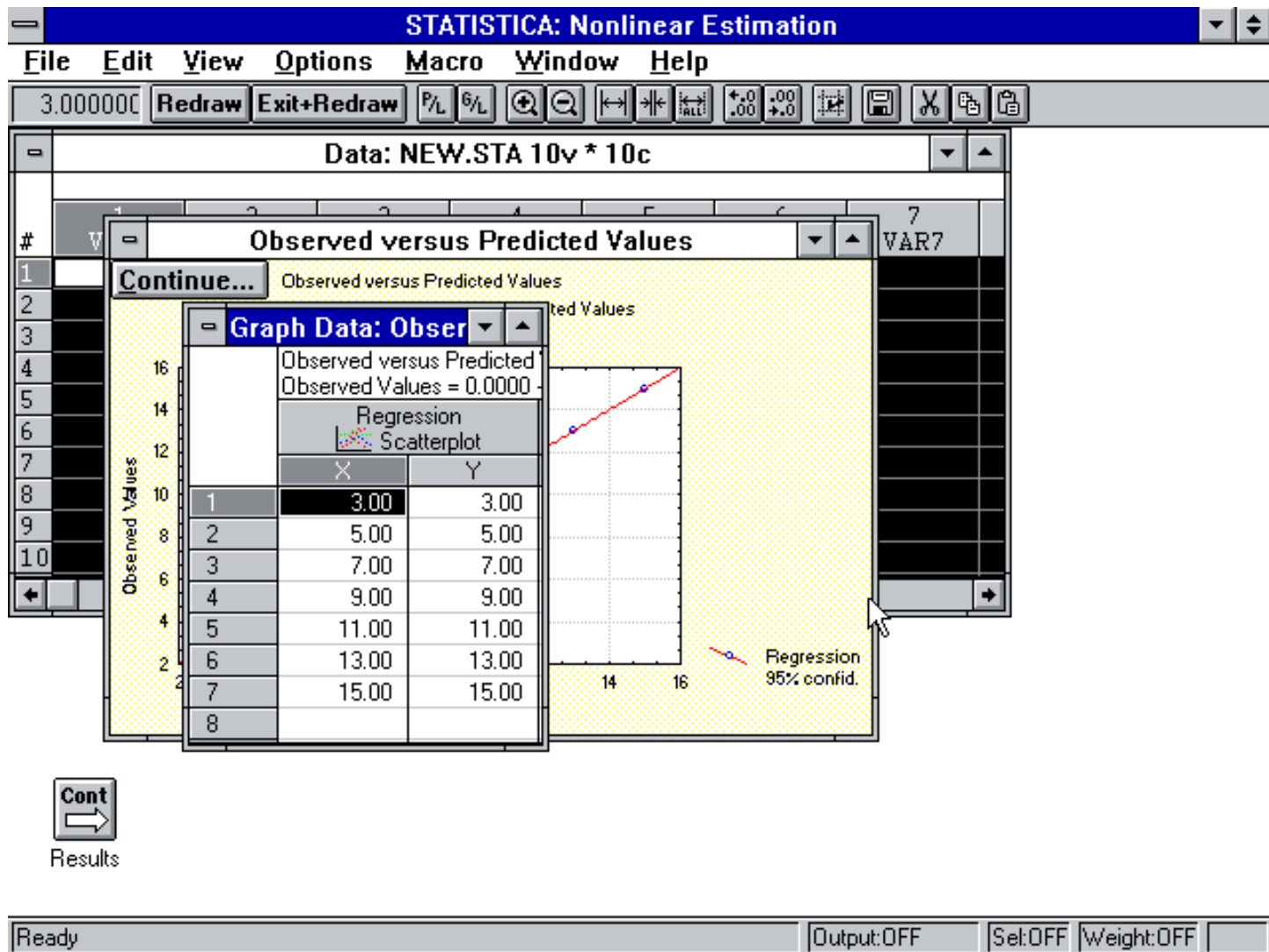
Ready

Output: OFF

Sel:OFF

Weight: OFF ☐





Data: NEW.STA 10v * 10c							
#	1 VAR1	2 VAR2	3 VAR3	4 VAR4	5 VAR5	6 VAR6	7 VAR7
1	0.000	2.500	3.000				
2	1.000	5.500	5.000				
3	2.000	7.000	7.000				
4	3.000	9.000	9.000				
5	4.000	12.000	11.000				
6	5.000	14.000	13.000				
7	6.000	12.000	15.000				
8							
9							
10							

Model: v3=const1*v1+const2 [new.sta]		
Continue...	Dep. var: VAR3 Loss: (OBS-PRED)**2	
	Final loss: 0.000000000 R=1.0000 Variance explained: 100.00%	
N=7	CONST1	CONST2
Estimate	2.000000	3.000000



Results

## Results

Model is:  $v3 = \text{const1} * v1 + \text{const2}$ 

Dependent variable: VAR3

Independent variables: 1

Loss function:  $(\text{OBS} - \text{PRED}) ** 2$ 

Final value: 0.000000000

Proportion of variance accounted for: 1.000000000 R = 1.000000000



Parameter estimates



Fitted 2D function &amp; observed vals



OK



Cov./corr. of parameters



Fitted 3D function &amp; observed vals



Cancel

☐ Scale MS-error to 1

Distribution of residuals



Residual values



Normal probability plot of residuals



Predicted values



Half-normal probability plot



Observed values



Predicted vs. observed values



Means &amp; standard deviations



Predicted vs. residual values



Difference (previous model)



Matrix plot for all variables



Save predicted and residual values



Box &amp; whisker plot for all vars.

Data: NEW.STA 10v * 10c				
Predicted Values (new.sta)				
#	Continue...	Predictd VAR3	5 VAR5	6 VAR6
1	C:1	3.00000		
2	C:2	5.00000		
3	C:3	7.00000		
4	C:4	9.00000		
5	C:5	11.00000		
6	C:6	13.00000		
7	C:7	15.00000		
8				
9				
10				

Model: $y_3 = \text{const1} * v_1 + \text{const2}$ (new.sta)		
NONLIN.	Dep. var:	VAR3 Loss: (OBS-PRED)**2
ESTIMAT.	Final loss:	0.000000000 R=1.0000 Variance explained: 100.00%
N=7	CONST1	CONST2
Estimate	2.000000	3.000000



Results

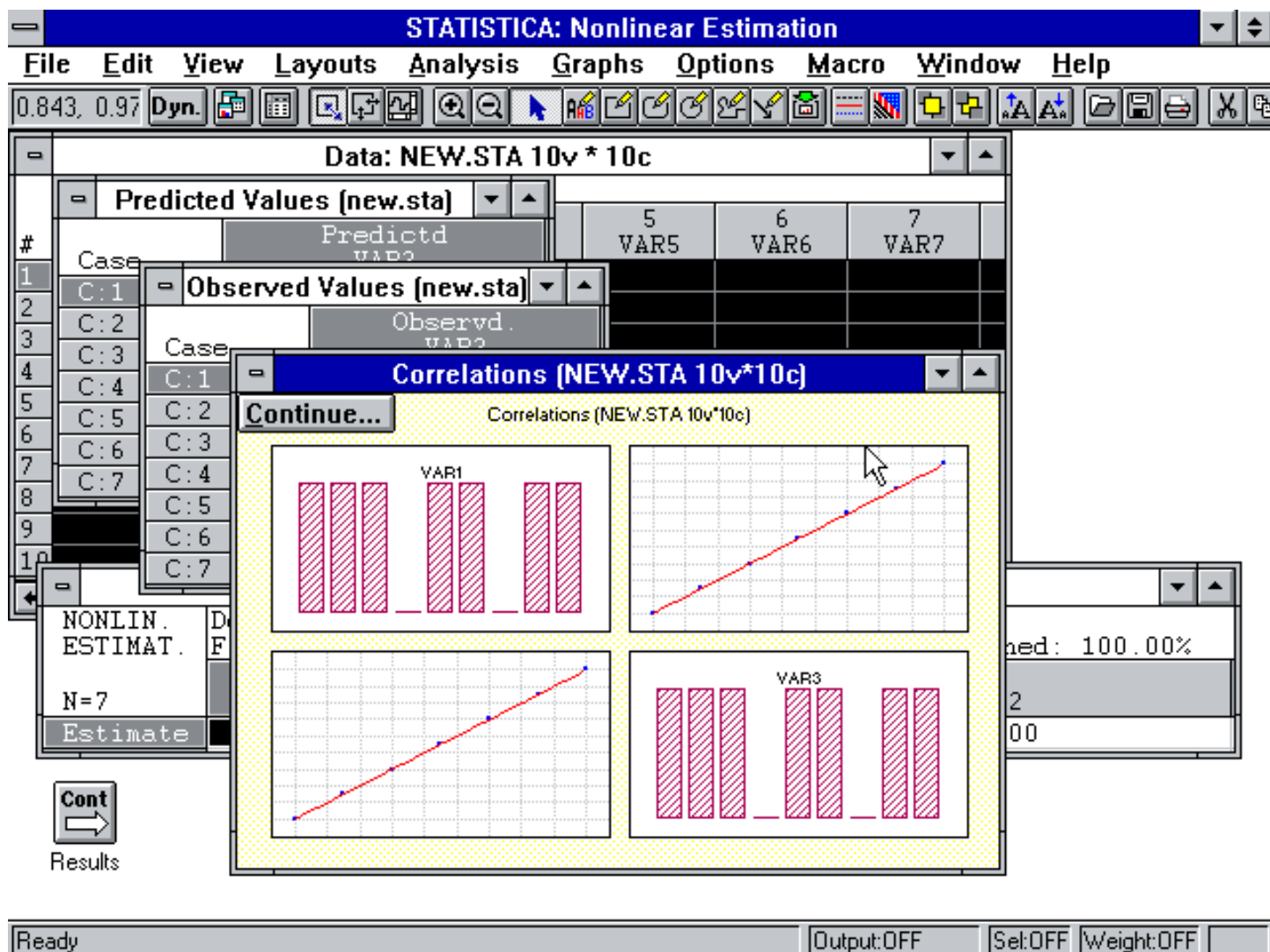
Data: NEW.STA 10v * 10c						
Predicted Values (new.sta)		5	6	7		
#	Case	Predictd VAR5	VAR6	VAR7		
1	C:1	Continue...		Observed. VAR3		
2	C:2					
3	C:3					
4	C:4					
5	C:5					
6	C:6					
7	C:7					
8	C:1			3.00000		
9	C:2			5.00000		
10	C:3			7.00000		
11	C:4			9.00000		
12	C:5			11.00000		
13	C:6			13.00000		
14	C:7			15.00000		

Model: VAR1+const2 (new.sta)		
NONLIN.	Dep. var:	VAR3 Loss: (OBS-PRED)**2
ESTIMAT.	Final loss:	0.000000000 R=1.0000 Variance explained: 100.00%
N=7	CONST1	CONST2
Estimate	2.000000	3.000000



Results



STATISTICA: Nonlinear Estimation

File Edit View Analysis Graphs Options Macro Window Help

0. [Icons] Vars 0

Startup Panel Ctrl+S

Resume Analysis Ctrl+R

User-specified regression

Logistic regression

Probit regression

Exponential growth regression

Piecewise linear regression

Other Statistics

#	1 VAR1	2 VAR2	3 VAR3	4 VAR4	5 VAR5	6 VAR6	7 VAR7
1	0.000	2					
2	1.000	5					
3	2.000	7					
4	3.000	9					
5	4.000	12.000	11.000				
6	5.000	14.000	13.000				
7	6.000	12.000	15.000				
8							
9							
10							

NONLIN. Dep. var.: VAR5 LOSS: (OBS-PRED)\*\*2

ESTIMAT. Final loss: 0.000000000 R=1.0000 Variance explained: 100.00%

N=7

	CONST1	CONST2
Estimate	2.000000	3.000000

Cont

Results

GRAPHICS

Correlations  
(NEW STA  
10v\*10c)

Brings up the starting dialog box for the current data analysis

Output:OFF

Sel:OFF

Weight:OFF

**STATISTICA: Nonlinear Estimation**

**File Edit View Analysis Graphs Options Macro Window Help**

0. [Icons] Vars Cases [Icons]

#	1 VAR1	VAR2
1	0.000	2.000
2	1.000	5.000
3	2.000	2.000
4	3.000	5.000
5	4.000	5.000
6	5.000	5.000
7	6.000	5.000
8		
9		
10		

NONLIN. ESTIMAT. Fi  
N=7  
Estimate

Correlations  
(NEW STA  
10v\*10c)

**Estimated function and loss function**

**Estimated function:**

$v2 = \text{const3} * v1 + \text{const4}$

**Loss function:**

$L = (\text{OBS} - \text{PRED})^{**2}$

Estimated function: 'estimated var' = expression; e.g.:  $v2 = \text{constant} + \text{beta} * v3$   
 Loss function: L = expression; e.g.:  $L = (\text{obs} - \text{pred})^{**2}$   
 Valid operators: + - \* \*\* / < > >= <= <> = ( )  
 Reference variables by number or name; e.g.:  $v3 = b1 * v4$  or  $\text{COST} = b1 * \text{SIZE}$   
 All unrecognized names are parameters; e.g.:  $v3 = \text{const} + \text{beta} * v4$   
 Use standard or scientific notation; e.g.:  $v3 = b1 * v1 / 3e+2$   
 Constants: Pi=3.14...; Euler=2.71...; e.g.:  $v3 = b * \text{Euler} * v3$   
 Functions: abs arcsin cos exp log log2 log10 sign sin sinh sqrt tan  
 Logical operations: true=1, false=0; e.g.:  $v2 = b1 * v3 * (v1 < 0) + b2 * v3 * (v1 >= 0)$   
 In loss function: PRED = predicted value, OBS = observed value  
 Default loss function is 'Least Squares,' that is:  $L = (\text{OBS} - \text{PRED})^{**2}$   
 Example 1: Failure =  $\exp(b0 + b1 * \text{Strength})$   $L = v5 * (\text{OBS} - \text{PRED})^{**2}$   
 Example 2:  $v4 = \exp(a + b1 * v4) / (1 + \exp(a + b1 * v4))$   $L = \text{Weight} * \text{abs}(\text{OBS} - \text{PRED})$

Output: OFF Sel: OFF Weight: OFF

**STATISTICA: Nonlinear Estimation**

**File Edit View Analysis Graphs Options Macro Window Help**

0. **Vars Cases**

**Data: NEW.STA 10v \* 10c**

#	1 VAR1	2 VAR2	3 VAR3	4 VAR4	5 VAR5	6 VAR6	7 VAR7
1	0.000	2.500	3.000				
2	1.000	5.500	5.000				
3	2.000	7.000	7.000				
4	3.000						
5	4.000						
6	5.000						
7	6.000						
8							
9							
10							

**User-Specified Regression Function**

**Function to be estimated & loss function**  **OK**

**Function:**  $v2 = \text{const3} * v1 + \text{const4}$

**Loss:**  $(\text{OBS} - \text{PRED})^2$

**Missing data:** Casewise

**Cancel**

NONLIN. Dep. var.: VAR2    INDEP. VARS: VAR1    LOSS: (OBS-PRED)\*\*2

ESTIMAT. Final loss: 0.000000000    R=1.0000    Variance explained: 100.00%

N=7

	CONST1	CONST2
Estimate	2.000000	3.000000

**Correlations (NEW.STA 10v\*10c)**

OK to continue; For help, press F1    Output:OFF    Sel:OFF    Weight:OFF

STATISTICA: Nonlinear Estimation

File Edit View Analysis Graphs Options Macro Window Help

0. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

# VAR

Model is:  $v2 = \text{const3} * v1 + \text{const4}$

Number of parameters to be estimated: 2

Loss function:  $(\text{OBS} - \text{PRED}) ** 2$

Dependent variable: VAR2

Independent variables: VAR1

Missing data are casewise deleted

Number of valid cases: 7

Estimation method: Quasi-Newton

☐ Asymptotic standard errors  
☐ Cja for finite diff. approx., 1.E-8

Maximum number of iterations: 50

Convergence criterion: .00010

Start values: .1 for all parameters

Initial step size: .50 for all parameters

Means & standard deviations

Matrix plot for all variables

Box & whisker plot for all vars.

OK Cancel

(NEW.STA  
10v\*10c)

For help, Press F1

Output:OFF Sel:OFF Weight:OFF

STATISTICA: Nonlinear Estimation

File Edit View Analysis Graphs Options Macro Window Help

Model Estimation

Model is:  $v2 = \text{const3} * v1 + \text{const4}$   
 Number of parameters to be estimated: 2  
 Loss function:  $(\text{OBS} - \text{PRED}) ** 2$

Parameter Estimation

| Iteration | Loss    | Parameters      |
|-----------|---------|-----------------|
| * 2       | 29.0256 | 1.01838 6.26275 |
| * 3       | 14.5798 | 1.42803 4.79798 |
| * 4       | 10.2768 | 1.80349 3.44654 |
| * 5       | 10.2768 | 1.80352 3.44665 |
| * 6       | 10.2768 | 1.80352 3.44662 |
| * 7       | 10.2768 | 1.80357 3.44643 |
| * 8       | 10.2768 | 1.80357 3.44643 |
| *         |         |                 |

Parameter estimation process converged

Cancel OK

Convergence criterion: .00010

Start values: .1 for all parameters

Initial step size: .50 for all parameters

Means & standard deviations

Matrix plot for all variables

Box & whisker plot for all vars.

(NEW.STA  
10v\*10c)

For help, Press F1

Output:OFF Sel:OFF Weight:OFF

## Results

Model is:  $v2 = \text{const3} * v1 + \text{const4}$ 

Dependent variable: VAR2

Independent variables: 1

Loss function:  $(\text{OBS} - \text{PRED})^2$ 

Final value: 10.276785714

Proportion of variance accounted for: .898608175 R = .947949458



Parameter estimates



Fitted 2D function &amp; observed vals



OK



Cov./corr. of parameters



Fitted 3D function &amp; observed vals

Cancel

☐ Scale MS-error to 1

Distribution of residuals



Residual values



Normal probability plot of residuals



Predicted values



Half-normal probability plot



Observed values



Predicted vs. observed values



Means &amp; standard deviations



Predicted vs. residual values



Difference (previous model)



Matrix plot for all variables



Save predicted and residual values



Box &amp; whisker plot for all vars.

[NEW.STA  
10v\*10c]

For help, Press F1


















Output:OFF

Sel:OFF

Weight:OFF

**STATISTICA: Nonlinear Estimation**

File Edit View Analysis Graphs Options Macro Window Help

1.8035714:                 

**Data: NEW.STA 10v \* 10c**

| # | 1<br>VAR1 | 2<br>VAR2 | 3<br>VAR3 | 4<br>VAR4 | 5<br>VAR5 | 6<br>VAR6 | 7<br>VAR7 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | 0.000     | 2.500     | 3.000     |           |           |           |           |
| 2 | 1.000     | 5.500     | 5.000     |           |           |           |           |
| 3 | 2.000     | 7.000     | 7.000     |           |           |           |           |
| 4 | 3.000     | 9.000     | 9.000     |           |           |           |           |

**Model: v2=const3\*v1+const4 [new.sta]**

Continue... Dep. var: VAR2 Loss: (OBS-PRED)\*\*2  
Final loss: 10.276785714 R=.94795 Variance explained: 89.861%

| N=7      | CONST3   | CONST4   |
|----------|----------|----------|
| Estimate | 1.803571 | 3.446429 |



Results



Correlations  
(NEW.STA  
10v\*10c)

Ready Output:OFF Sel:OFF Weight:OFF

